

CLAIMS

1. A mineral fibre product comprising fibres formed of a silicate network and comprising silicon, calcium, magnesium, iron, aluminium, oxygen and optionally alkali metal atoms characterised in that the fibres have an analysis (expressed as % by weight oxides) including at least 3% FeO and 0 to 8% alkali metal oxide and at least 5% MgO, at least 70% of the iron is ferric and the fibres have a core surrounded by an outer surface layer less than 1µm thick in which the peak concentration of magnesium atoms is at least 1.5 times the concentration of magnesium atoms in the total fibre.
2. A product according to claim 1 in which the surface layer has a peak concentration of calcium atoms greater than the concentration of calcium atoms in the total fibre.
3. A product according to claim 2 in which the surface layer has a peak concentration of calcium atoms at least 1.5 times the concentration of calcium atoms in the total fibre.
4. A product according to any preceding claim in which the surface layer has a peak concentration of iron atoms at least 1.2 times the concentration of iron atoms in the total fibre.
5. A product according to any preceding claim in which the surface layer merges with the core and has been formed by outwards diffusion of magnesium ions to the surface of the fibres.
6. A product according to any preceding claim in which the peak concentration of magnesium is at least 2 times and preferably at least 4 times the concentration of magnesium in the total fibre.
7. A product according to any preceding claim in which at least 95% of the iron is ferric.
8. A product according to any preceding claim in which the fibres have an analysis (expressed as % by weight oxides) including at least 3% FeO, 0 to 8% alkali metal

oxide, 33 to 55% SiO<sub>2</sub>, at least 8% CaO, at least 5% MgO and up to 25% Al<sub>2</sub>O<sub>3</sub>.

9. A product according to any preceding claim in which the fibres are fibres which have been formed by centrifugal  
5 fiberisation of a melt in which the iron is mainly ferrous.

10. A product according to any preceding claim comprising a batt or web wherein the fibres having the surface layer are distributed substantially uniformly throughout the batt or web.

10 11. A product according to any preceding claim comprising a batt comprising the fibres having the surface layer and a non-combustible system for improving the structural integrity of the batt, wherein the system is selected from needling of the batt, an inorganic bonding agent, and  
15 sewing of the batt by inorganic threads.

12. A product according to any preceding claim in the form of a fire door or sandwich panel which has been made by forming a batt comprising the fibres having the surface layer and then partly or wholly enclosing the batt within  
20 sheet materials.

13. A method of treating mineral fibres formed of a silicate network to improve their high temperature properties wherein the fibres comprise silicon, calcium, magnesium, iron, aluminium, oxygen and optionally alkali  
25 metal atoms, characterised in that the fibres have an analysis (expressed by weight oxides) including iron in an amount of at least 3% measured as FeO and in which there is at least 2% iron (measured as FeO) present as ferrous iron, 0 to 8% alkali metal oxide and at least 5% MgO, and the  
30 method comprises exposing the fibres containing at least 2% by weight ferrous iron under oxidising conditions to a controlled increased temperature which is above the temperature at which oxidation of the iron in the fibres occurs but which is below the temperature at which  
35 substantial network crystallisation occurs and thereby oxidising the ferrous iron to provide fibres in which at least 70% of the total iron is ferric.

14. A method according to claim 13 in which the fibres are exposed under oxidising conditions to a temperature which is at least  $T_g - 50^\circ\text{C}$  (and preferably at least  $T_g$ ) but below  $T_c$  (preferably not more than  $T_g + 100^\circ\text{C}$ ).
- 5 15. A method according to claim 13 or claim 14 in which the controlled increased temperature is increased during the process.
16. A method according to claim 15 in which the rate of increase of the temperature to which the fibres are  
10 subjected at temperatures above  $T_g - 20^\circ\text{C}$  is less than  $20^\circ\text{C}$  per minute.
17. A method according to any of claims 13 to 15 in which the fibres are initially formed by centrifugal fiberisation of a melt formed in a cupola furnace.
- 15 18. A method according to any preceding claim in which the fibres are formed and collected as a batt or web and the batt or web is then exposed to the controlled increased temperature in a heated, forced draft, oven.